

## PATENT ABSTRACTS OF JAPAN

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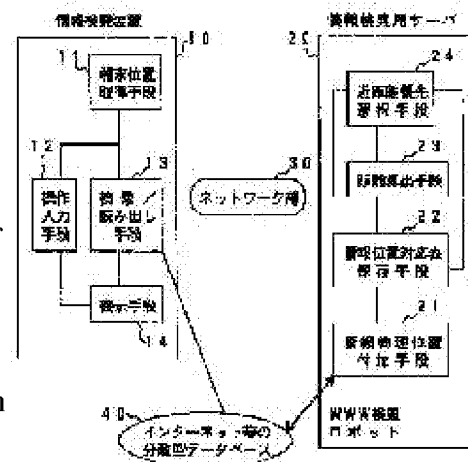
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(54) PORTABLE INFORMATION RETRIEVAL DEVICE, SERVER FOR INFORMATION RETRIEVAL, AND INFORMATION RETRIEVAL SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the position input type portable information retrieval device, server for information retrieval, and information retrieval system which preferentially retrieve and display network information nearby the in-use device of the information retrieval device in terms of the distance.

SOLUTION: A terminal position acquiring means 11 finds the physical in-use position of the information retrieval device 10 as a portable terminal and sends it to the server 20 for information retrieval. The server 20 calculates the distance between the in-use position of the portable terminal and a physical position regarding each piece of information by using a correspondence table of physical positions and information addresses obtained from position relative information included in each piece of information in a decentralized data base 40. On the basis of the calculation result, the information address of information at a short distance is preferentially selected and sent back to the information retrieval device 10. The information retrieval device 10 displays a list for selecting information to be retrieved, and retrieves and reads the information out according to operation input.



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## CLAIMS

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[Claim(s)]

[Claim 1]An operation input means which is a device for retrieving information on a distributed database constituted on a network with a personal digital assistant, and inputs start indication of search, and selection instructing of information, A terminal position acquisition means which acquires a physical using position of a personal digital assistant, and the search/reading means which reads information accumulated in other information storing devices via a network of a cable or radio, A portable information retrieval device provided with a displaying means which displays an information address which serves as retrieval candidates obtained based on a using position of a personal digital assistant acquired by said terminal position acquisition means or its selection information, and information acquired as a result of search.

[Claim 2]The portable information retrieval device according to claim 1, wherein said terminal position acquisition means is a means to compute a physical using position of a personal digital assistant based on radio-field-intensity data from two or more radio station base stations using GPS.

[Claim 3]A physical location obtained from position related information included in information which is a server for supporting information retrieval of a distributed database, and was accumulated on a distributed database, An information position conversion table preserving means which saves a conversion table with an information address for accessing information, A distance calculation means which computes distance of a using position of a personal digital assistant with which information is retrieved, and a physical location concerning information accumulated on a distributed database obtained from said information position conversion table preserving means, A server for information retrieval having a short-distance priority selecting means which chooses preferentially information which exists at a short distance among information accumulated on a distributed database based on size of computed distance as a candidate of information used as a retrieval object, and notifies the information address to a personal digital assistant.

[Claim 4]An access frequency acquisition means which is a server for supporting information retrieval of a distributed database, and acquires access frequency to information accumulated on a distributed database, A physical location obtained from position related information included in information accumulated on a distributed database, Access frequency acquired by said access frequency acquisition means for information, An information position access frequency conversion table preserving means which saves a conversion table with an information address for accessing information, A distance calculation means which computes distance of a using position of a personal digital assistant with which information is retrieved, and a physical location concerning information accumulated on a distributed database obtained from said information position conversion table preserving means, Among a fixed number of information, in information which is in a fixed distance from a using position of a personal digital assistant based on computed distance, or order near from a using position of a personal digital assistant, A server for information retrieval having an access frequency priority selecting means which chooses information with much access frequency preferentially as a candidate of information used as a retrieval object, and notifies the information address to a personal digital assistant.

[Claim 5]Claim 3. Or in the server for information retrieval according to claim 4, By addition of position information extracted from a text peculiar to places which search information and an information address which were accumulated on a distributed database, and are included in information, such as the name of a place, an address, and a telephone number, or a special symbol

specified beforehand. A server for information retrieval having an information physical position addition means which adds physical position information to an information address based on directed position information.

[Claim 6]In the server for information retrieval according to claim 5, said distributed database, Are a database of WWW constituted on the Internet and said information physical position addition means, A server for information retrieval searching information and an information address which were accumulated on a distributed database by a WWW search robot method of searching WWW on the Internet autonomously.

[Claim 7]An operation input means which is an information retrieval system which retrieves information on a distributed database constituted on a network with a personal digital assistant, and inputs start indication of search, and selection instructing of information, A terminal position acquisition means which acquires a physical using position of a personal digital assistant, and a physical location obtained from position related information included in information accumulated on a distributed database, An information position conversion table preserving means which saves a conversion table with an information address for accessing information, A distance calculation means which computes distance of a using position of a personal digital assistant with which information is retrieved, and a physical location concerning information accumulated on a distributed database obtained from said information position conversion table preserving means, A short-distance priority selecting means which chooses preferentially information which exists at a short distance among information accumulated on a distributed database based on size of computed distance as a candidate of information used as a retrieval object, The search/reading means which reads information accumulated in other information storing devices via a network of a cable or radio, An information retrieval system provided with a displaying means which displays an information address of information which serves as a candidate of a retrieval object selected by said short-distance priority selecting means or its selection information, and information acquired as a result of search.

[Claim 8]An operation input means which is an information retrieval system which retrieves information on a distributed database constituted on a network with a personal digital assistant, and inputs start indication of search, and selection instructing of information, A terminal position acquisition means which acquires a physical using position of a personal digital assistant, and an access frequency acquisition means which acquires access frequency to information accumulated on a distributed database, A physical location obtained from position related information included in information accumulated on a distributed database, Access frequency acquired by said access frequency acquisition means for information, An information position access frequency conversion table preserving means which saves a conversion table with an information address for accessing information, A distance calculation means which computes distance of a using position of a personal digital assistant with which information is retrieved, and a physical location concerning information accumulated on a distributed database obtained from said information position conversion table preserving means, Among a fixed number of information, in information which is in a fixed distance from a using position of a personal digital assistant based on computed distance, or order near from a using position of a personal digital assistant, . Were accumulated in other information storing devices via a network of an access frequency priority selecting means which chooses information with much access frequency preferentially as a candidate of information used as a retrieval object, and a cable or radio. An information retrieval system provided with a displaying means which displays an information address of information which serves as a candidate of a retrieval object selected by the search/reading means which reads information, and said access frequency priority selecting means or its selection information, and information acquired as a result of search.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to position input [ which retrieves and displays automatically the using position of a personal digital assistant, and the information on a network with relation ] type a portable information retrieval device, the server for information retrieval, and an information retrieval system.

[0002]

[Description of the Prior Art]In a distributed database like WWW (World Wide Web) built on the Internet, the information on a database was unrelated to the position in the physical world of a retrieval device. Therefore, when information was retrieved with the conventional information retrieval device, information unrelated to the using position of an information retrieval device was also included in search results. For this reason, the information acquired had the problem that a thing unrelated to a user's behavior range increased. Information dispatch with the gestalt of "liking to carry out information dispatch at a user near in distance" was difficult also for the information addresser side.

[0003]In order to perform information retrieval, it searches by inputting the address of the information investigated beforehand. Or the information which is related to a keyword is retrieved by inputting a keyword using a search engine. That is, the user was retrieving information, after getting to know what kind of information there is to some extent beforehand. However, though the information about near the using position of a terminal exists, when there was no telling what kind of information there is (i.e., when the retrieval key word about the address of information and neighboring information, the name of a place, etc. are not known beforehand), search of such information was difficult.

[0004]Generally, the method of displaying some of access frequency is used as a method of retrieving popular information for the information on a distributed database, and displaying for it. However, this is presenting of the information which is popular regardless of the using area of an information retrieval device, and there was no means to have retrieved popular information and to display in the specific area which uses an information retrieval device.

[0005]In the distributed database top of hypertext structure like WWW, According to hypertext structure from the information on a database, and its information. As a program which retrieves recursively the information currently referred to and collects the data for retrieval by keyword of the address of each information, hypertext structure, the keyword for search, etc., A thing like a WWW search robot. [reference:"The TkWWW Robot:Beyond Browsing", Spetka, Scott, Proceedings of the Second InternationalWorld Wide Web known conference, October 1994].

[0006]

[Problem(s) to be Solved by the Invention]This invention realizes position input [ which searches and displays preferentially the using position of an information retrieval device, and network information near in distance for the purpose of solution of the above-mentioned problem ] type a portable information retrieval device, the server for information retrieval, and an information retrieval system.

[0007]

[Means for Solving the Problem]In order to retrieve near information physically to a using position of an information retrieval device, it is necessary to add position information on the physical

worlds, such as latitude longitude information, to a means to get to know a physical position of an information retrieval device, and an address of information on a distributed database, for example. In order to acquire a physical using position of an information retrieval device, sensors, such as GPS (Global Positioning System), are used. GPS is a system which receives an electric wave from a satellite which the U.S. Department of Defense launched, and pinpoints a position of a reception point.

[0008]On the other hand, in order to add physical location information to information on a database, by methods, such as a WWW search robot who searches WWW on the Internet autonomously. An address of information and information accumulated on a database. It searches and physical position information is added to an address of information based on latitude longitude information put between the 1st special symbol that approximated latitude longitude information based on a text peculiar to places included in information, such as the name of a place, an address, and a telephone number, or was specified beforehand, and the 2nd special symbol.

[0009]An information retrieval device and an absolute position of information are defined by this method, and it becomes possible to search and display preferentially a using position of an information retrieval device, and network information near in distance by computing both distance. Since an input of search is an output of a sensor which acquires a physical location of an information retrieval device, it becomes unnecessary for an operator to get to know an information address and a retrieval key word for retrieving information related to a place in which he is present now, and to input it.

[0010]When information retrieval is performed using this device, it becomes possible by matching selection frequency of actually selected information with an address of information, and saving it to retrieve and display popular information in a certain specific information retrieval device using area.

[0011]Even if an operator does not know a neighboring address or a retrieval key word of information for carrying out information retrieval beforehand by this invention, by inputting a search start key, It becomes possible to search and display preferentially a using position of an information retrieval device, and network information near in distance, and to retrieve and display popular information in a certain specific information retrieval device using area.

[0012]

[Embodiment of the Invention]Below, an embodiment of the invention is described. The example of composition concerning a 1st embodiment of this invention is shown in drawing 1. 10 is an information retrieval device, a terminal position acquisition means and 12 express an operation input means, 13 expresses search/reading means, and 11 expresses a displaying means 14. 20 is a server for information retrieval, an information physical position addition means and 22 express an information position conversion table preserving means, 23 expresses a distance calculation means, and 21 expresses a short-distance priority selecting means 24. The distributed database which is an information group which distributes 30 to a network part, distributes 40 on networks, such as the Internet, and is arranged is expressed.

[0013]The terminal position acquisition means 11 acquires the using position information on the information retrieval device 10 which is a personal digital assistant (latitude, longitude information), for example by GPS. As an acquisition method of position information, the method of computing the position of a personal digital assistant based on the radio-field-intensity data from two or more radio station base stations may be used.

[0014]Let the search start button or retrieval object word input by operation of the user using the operation input means 12 be a start trigger of search. An input of a search start trigger will acquire by the terminal position acquisition means 11, the using position, for example, the latitude longitude information, of the information retrieval device 10. By search / reading means 13, the using position of the information retrieval device 10 is transmitted to the server 20 for information retrieval via the network part 30. By transmitting a retrieval object word in addition to a using position, the information which has relation in the retrieval object word position [ the word ] and inputted can also be made into a retrieval object.

[0015]In the distance calculation means 23, the distance of the physical position information added to the information saved at the using position and the information position conversion table preserving means 22 of the acquired terminal is computed. What is necessary is just to make distance into the distance for two points, the latitude longitude of a terminal position, and the

latitude longitude added to information, etc., for example. Based on the computed result of the distance calculation means 23, the short-distance priority selecting means 24 chooses the address of the information within fixed numbers or constant distance in order of the information near the using position of a terminal, and replies it to search / reading means 13 of the information retrieval device 10.

[0016]Search / reading means 13 displays the address of the replied information on the displaying means 14. A display may be displayed with a text list type and may display on map information. An operator chooses information to refer to by the operation input means 12, retrieves information via search / reading means 13, and displays on the information retrieval device 10 of a personal digital assistant.

[0017]The information physical position addition means 21 which adds physical location information like latitude longitude information to information, for example is explained. Beforehand, the address of information and information accumulated on the database is searched by methods, such as a WWW search robot who searches WWW on the Internet autonomously. and latitude longitude information based on a text peculiar to places included in the retrieved information, such as the name of a place, an address, and a telephone number, [ approximate or ] Physical position information is added to the address of information based on the latitude longitude information put between the 1st special symbol specified beforehand and the 2nd special symbol.

[0018]The result of having added physical position information to the address of information is saved at the information position conversion table preserving means 22, and it uses for the distance calculation of the using position of a terminal, and the physical position of information in the distance calculation means 23 at the time of information retrieval.

[0019]Drawing 3 shows the example of the information position conversion table saved at the information position conversion table preserving means 22. The information position conversion table has memorized the group of an information address like URL in the Internet, and the latitude longitude information acquired from the contents of the information which the information address shows, as shown in drawing 3.

[0020]By the above composition, the operator can know the information near a position input type information retrieval device only by inputting a search start button, and those information can be further retrieved by selection operation.

[0021]Drawing 2 shows the example of composition concerning a 2nd embodiment of this invention, and the big difference with a 1st embodiment is that the server 50 for information retrieval has the information position access frequency conversion table preserving means 52, the access frequency acquisition means 53, and the access frequency priority selecting means 55. The information physical position addition means 51 and the distance calculation means 54 are the same as the information physical position addition means 21 of drawing 1, and the distance calculation means 23 respectively.

[0022]In the access frequency acquisition means 53, when adding the information to which the using position of a device is transmitted like this position input type information retrieval system at the time of information retrieval and performing information retrieval, the access frequency of each read information is counted. The count of access frequency can be performed by using the method which search / reading means 13 searches via the server 50 for information retrieval, for example, or the method of notifying the information address which search / reading means 13 searched to the server 50 for information retrieval.

[0023]The access frequency of each information acquired by the access frequency acquisition means 53 is saved at the information position access frequency conversion table preserving means 52 with the information physical position added by the address and the information physical position addition means 51 of information. And in the access frequency priority selecting means 55 which chooses the address of the information replied to search / reading means 13, information with much [ in the information which is in a fixed distance from the using position of a terminal, or order near from the using position of a terminal ] access frequency among a fixed number of information is chosen preferentially.

[0024]Drawing 4 shows the example of the information position access frequency conversion table saved at the information position access frequency conversion table preserving means 52. The information position access frequency conversion table has memorized the group of the number of times by which an information address like URL in the Internet, the latitude longitude information

acquired from the contents of the information which the information address shows, and its information were accessed, as shown in drawing 4. As for this access frequency, in order to be able to reflect popular time transition, it is desirable that it is made to perform initialization or regulated treatment of a value if needed for every suitable period.

[0025]By this method, the operator can know now information with much access frequency in the using position of a certain specific information retrieval device. The information position access frequency conversion table shown in the information position conversion table shown in drawing 3, or drawing 4 as other embodiments of this invention via external storage or a network in the information retrieval device 10. Giving the function same in the information retrieval device 10 which is incorporated beforehand and carried as the servers 20 and 50 for information retrieval is also considered.

[0026]

[Effect of the Invention]The information which is needed with a portable information retrieval device is information relevant to the using position of the retrieval device. Even if an operator does not know the neighboring address or retrieval key word of information for carrying out information retrieval beforehand by this invention, by inputting a search start key, It becomes possible to search and display preferentially the using position of an information retrieval device, and network information near in distance, and to retrieve and display popular information in a certain specific information retrieval device using area. Information sending for specific areas becomes possible also for the addresser side.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a figure showing the example of composition concerning a 1st embodiment of this invention.

[Drawing 2]It is a figure showing the example of composition concerning a 2nd embodiment of this invention.

[Drawing 3]It is a figure showing the example of the information position conversion table saved at an information position conversion table preserving means.

[Drawing 4]It is a figure showing the example of the information position access frequency conversion table saved at an information position access frequency conversion table preserving means.

[Description of Notations]

10 Information retrieval device

11 Terminal position acquisition means

12 Operation input means

13 Search/reading means

14 Displaying means

20 The server for information retrieval

21 Information physical position addition means

22 Information position conversion table preserving means

23 Distance calculation means

24 Short-distance priority selecting means

30 Network part

40 Distributed database

50 The server for information retrieval

51 Information physical position addition means

52 Information position access frequency conversion table preserving means

53 Access frequency acquisition means

54 Distance calculation means

55 Access frequency priority selecting means

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[Translation done.]